

Unit 2 Test – Polynomial and Rational Functions

PRACTICE

Expectation	Level
C1. identify and describe some key features of polynomial functions, and make connections between the numeric, graphical, and algebraic representations of polynomial functions;	

1) Fill in the following chart

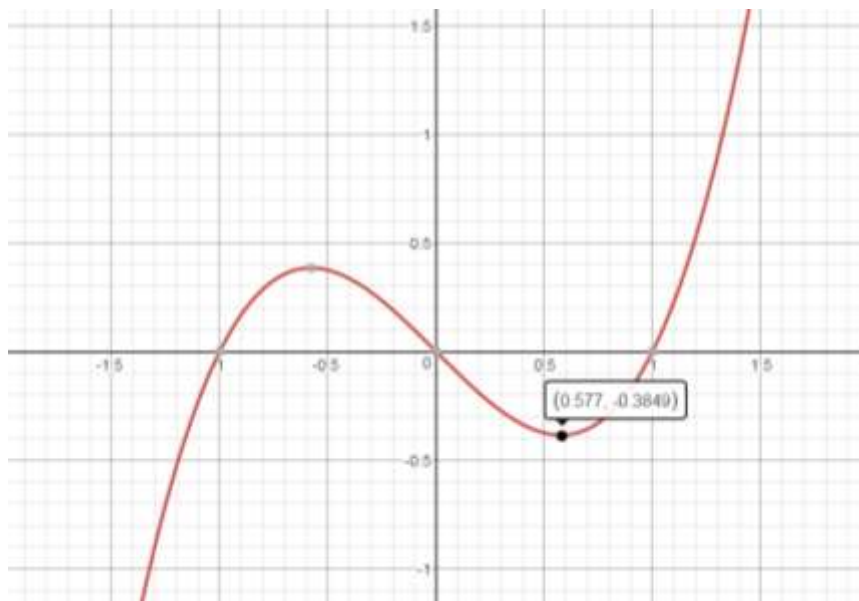
Function	Degree	Positive or Negative Lead Coefficient	y-intercept	Max number of turning points	Min number of zeros
$f(x) = -x + 5x^2 - 6x^3 + 10$					
$g(x) = -4x^2 + 3x + 1$					
$h(x) = x^5 - x^4 - 2x^3 + 8x^2 - 6x$					
$f(x) = (x - 4)^3(x - 1)$					

2) What is the maximum and minimum number of turning points that a polynomial function can have? How do you know?

- 3) If any of the linear factors of a polynomial function are cubed or to the exponent 4, what do you know about the corresponding x -intercepts?

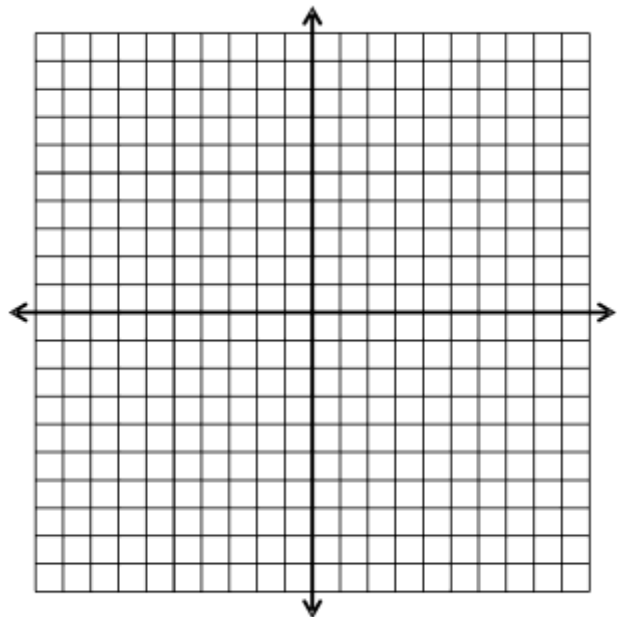
- 4) Is $x-3$ a factor of $h(x) = x^5 - x^4 - 2x^3 + 8x^2 - 6x$? Explain how you know.

- 5) What is the equation of the graph shown below?



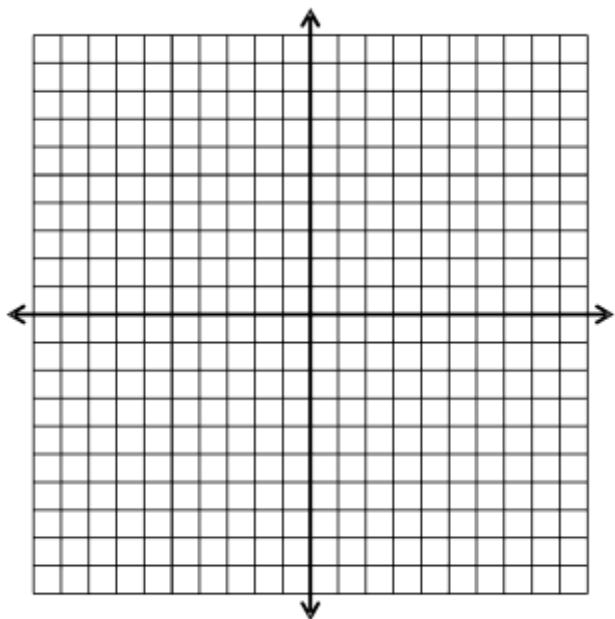
6) **Sketch** a function with the following properties:

- Horizontal asymptote at $y = -7$
- Vertical Asymptote at $x = 2$
- y -intercept at -1



6b) What is a possible equation for your function?

7) Determine **an equation** for a fifth-degree polynomial function that intersects the x -axis at only 3, and -5 , and **sketch the graph** of the function.



Expectation	Level
C3 - solve problems involving polynomial and simple rational equations graphically and algebraically;	

7.) Factor the following fully

a) $4x^4 + 7x^3 - 80x^2 - 21x + 270$

8.) Calculate $(6x^4 - 6x^3 + 5x^2 - 12x + 1) \div (x + 2)$

9.) A box is in the shape of a rectangular prism. The length is 12 cm greater than the width and the ends are square. The volume of the box is 135 cm^3 . What are the dimensions of the box?

10.) The Turtledove Chocolate factory has two chocolate machines. Machine A takes s minutes to fill a case with chocolates, and machine B takes t minutes to fill a case. Working together, the two machines take 15 min to fill a case. Approximately how long does each machine take to fill a case?